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**ENVIRONMENT** 

## Coal: Could Be The End Of The Line

Prices would soar if the U.S. clamped down on carbon emissions

If Vinod Khosla is right, the nation's energy mix may be poised for a profound shift. Like most Americans, the legendary venture capitalist and founder of Sun Microsystems Inc. (<u>SUNW</u>) once assumed that coal was a necessary evil. After all, plants that burn it provide half of the nation's electricity. The U.S. has more than 270 billion tons of the stuff in the ground - a 200-year supply -- and utilities have plans to build more than 150 additional plants. Khosla has been funneling cash into biofuels and other forms of green energy. But he says he "assumed that coal was impossible to displace."

Not anymore. Khosla is taking a hard look at the economics of electric power and says he has come away "totally shocked." The era of coal may be ending, he declares: "Nobody in their right minds should be building a coal plant."

Has Khosla gone off the deep end? If so, he's not alone. "It's the definition of financial insanity to invest in a new coal plant," agrees Marc Brammer, head of research for consulting firm Innovest Strategic Value Advisors. Even some utility executives see big risks. "It's very likely the investment decisions many are making, to build long-lived high-carbon-dioxide-emitting power plants, are decisions we'll all live to regret," warns Vice-President Gary Serio of Entergy Corp. (ETR), which owns several coal plants.

Here's Khosla's argument: Much of the developed world has already imposed curbs on greenhouse gas emissions, and the U.S. is likely to follow suit. The European experience suggests that the cost of emitting a ton of CO2 is about \$20 to \$25. Since coal-fired power plants emit more than twice as much CO2 for the same amount of electricity as natural-gas-fired plants, coal gets hit hardest by the curbs. The effective price of coal could leap as much as sixfold, raising the cost of producing electricity by about 50%.

Many utilities' current proposals for coal-fired plants don't fully account for those risks, says Michael J. Bradley, founder of the Clean Energy Group, a utility association. Those companies "could be really jeopardizing their stockholders' investment," warns one utility executive.

Some industry experts see the rash of proposals for new coal plants -- such as 11 planned by TXU (<u>TXU</u>) in Texas -- as a strategy for getting in under the wire. "I think they see a window before the carbon costs hit," says Roger W. Gale, president of consultant GF Energy. The companies hope they can get the plants grandfathered under the rules or pass along the added costs to consumers. TXU spokesperson Kimberly Morgan says that regulations are years away, that the company has considered the risks, and that more electricity is badly needed. That's why stocks like TXU's haven't taken a hit.

Without coal, where will power come from? Khosla's grand vision is to repower the U.S. via solar plants in the American Southwest. The idea: Use thousands of acres of mirrors to focus solar energy, heating water to drive turbines. An analysis of new Australian solar technology suggests that it is cost-competitive even with today's coal plants. "I'm almost convinced that the cheapest plant would be solar thermal," says Khosla.

Skeptics wonder if Khosla is talking down coal to pump up his investments in clean energy. He declines to discuss these stakes in detail, but he says: "I only invest in what I believe in." Meanwhile utilities have begun seriously exploring solar

technologies. Austin Energy, for instance, is now getting bids on a plant of up to 50 megawatts.

Investors in coal are starting to fret about the risks of emissions regulations. And some customers are starting to insist that their power come from clean sources: Witness California's all-green energy initiatives. That trend could grow as new science prompts more dire warnings about global warming. "I've never seen a phenomenon take over the public consciousness" like climate change, observes David Crane, CEO of NRG Energy Inc., a Princeton (N.J.) utility. "This is the kind of thing that could stop coal."

By John Carey

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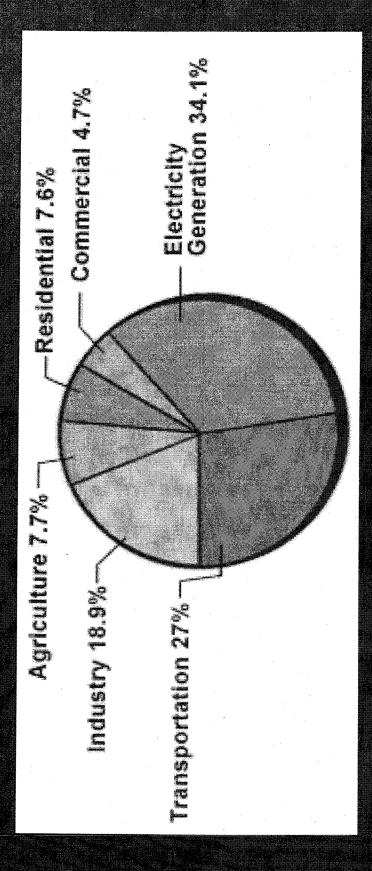
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## U.S. Global Warming Emissions



US Sources of greenhouse gas emissions in 2001.

Source: US Dept. of Transportation 2004

## Biofuels Policy Pitfall #

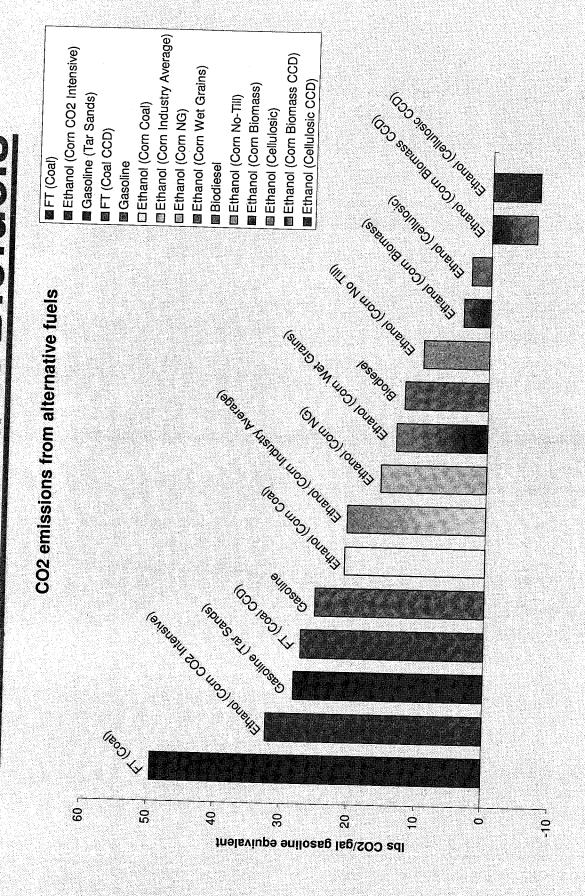


Table 1. Montana Historical and Reference Case GHG Emissions, by Sector<sup>a</sup>

Table 1. Montana Histor	rical an	d Refere	ence Ca	se GHG	Emissi	ons, by Sector <sup>a</sup>
(Million Metric Tons CO₂e)	1990	2000	2005	2010	2020	<b>Explanatory Notes for Projections</b>
Electricity Production	9.3	9.9	11.4	11.7	13.4	•
Coal	15.3	16.4	19.4	20.2	22.1	See electric sector assumptions
Natural Gas	0.0	0.0	0.0	0.1	0.3	in appendix
Oil	0.0	0.8	0.1	0.1	0.1	
Net Exported Electricity	-6.1	-7.4	-8.2	-8.7	-9.1	
Res/Comm/Non-Fossil Ind (RCI)	4.4	4.4	4.6	5.0	5.2	
Coal	0.5	0.3	0.3	0.3	0.3	Based on USDOE regional projection
Natural Gas	1.9	3.0	2.8	3.0	3.2	Based on USDOE regional projection
Oil	1.9	1.1	1.6	1.7	1.7	Based on USDOE regional projection Assumes (for now) no change after
Wood (CH₄ and N₂O)	0.0	0.0	0.0	0.0	0.0	2003
<u> </u>	5.9	7.3	7.9	8.9	11.0	
Motor Gasoline	3.8	4.4	4.6	5.0	6.1	Based on USDOE regional projection
Diesel	1.7	2.5	3.0	3.5	4.3	Based on USDOE regional projection
Natural Gas, LPG, other Jet Fuel and Aviation	0.1	0.1	0.1	0.1	0.1	Based on USDOE regional projection
Gasoline	0.3	0.3	0.3	0.4	0.5	Based on USDOE regional projection
Fossil Fuel Industry	3.4	3.9	4.8	5.5	6.4	
Natural Gas Industry	1.2	1.5	1.9	2.2	2.2	Increase based on current trend to 2010, then constant production
Oil Industry	2.0	2.2	2.8	3.2	4.0	Increase based on current trend to 2010, then constant production Assumes (for now) no change after
Coal Mining (Methane)	0.2	0.2	0.2	0.2	0.2	2004
ndustrial Processes	0.1	0.2	0.3	0.3	0.5	
ODS Substitutes	0.0	0.1	0.1	0.2	0.3	Based on national projections (State Dept.)
SF <sub>6</sub> from Electric Utilities	0.0	0.0	0.0	0.0	0.0	Based on national projections (USEPA)
Cement & Other Industry	0.1	0.1	0.1	0.2	0.2	Increases with state population
Carbon Dioxide Use	0.1	0.1	0.1	0.2	0.2	not yet estimated
Vaste Management	0.2	0.3	0.3	0.3	0.3	not you down and
		0.0	0.0	0.0	0.0	Projections primarily based on
Solid Waste Management	0.1	0.2	0.2	0.2	0.2	population.
Wastewater Management	0.1	0.1	0.1	0.1	0.1	Projections based on population.
Agriculture	7.9	9.5	7.9	7.9	7.9	
Manure Mgmt & Enteric						Projections held constant at 2005
Ferment.	3.2	3.7	3.6	3.6	3.6	levels Projections held constant at 2005
Ag. Soils and Residue Burning	4.7	5.8	4.2	4.2	4.2	levels
Total Gross Emissions	31.2	35.4	37.2	39.7	44.6	
increase relative to 1990		13%	19%	27%	43%	
Forestry and Land Use	-49.7	-49.7	-49.7	-49.7	-49.7	Historical and projected emissions held at 2004 levels.
Net Emissions (incl. forestry*)	-18.5	-14.3	-12.5	-10.0	-5.1	
increase relative to 1990		-23%	-32%	-46%	-72%	
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<sup>&</sup>lt;sup>a</sup> Totals may not equal exact sum of subtotals shown in this table due to independent rounding. NA = not available.